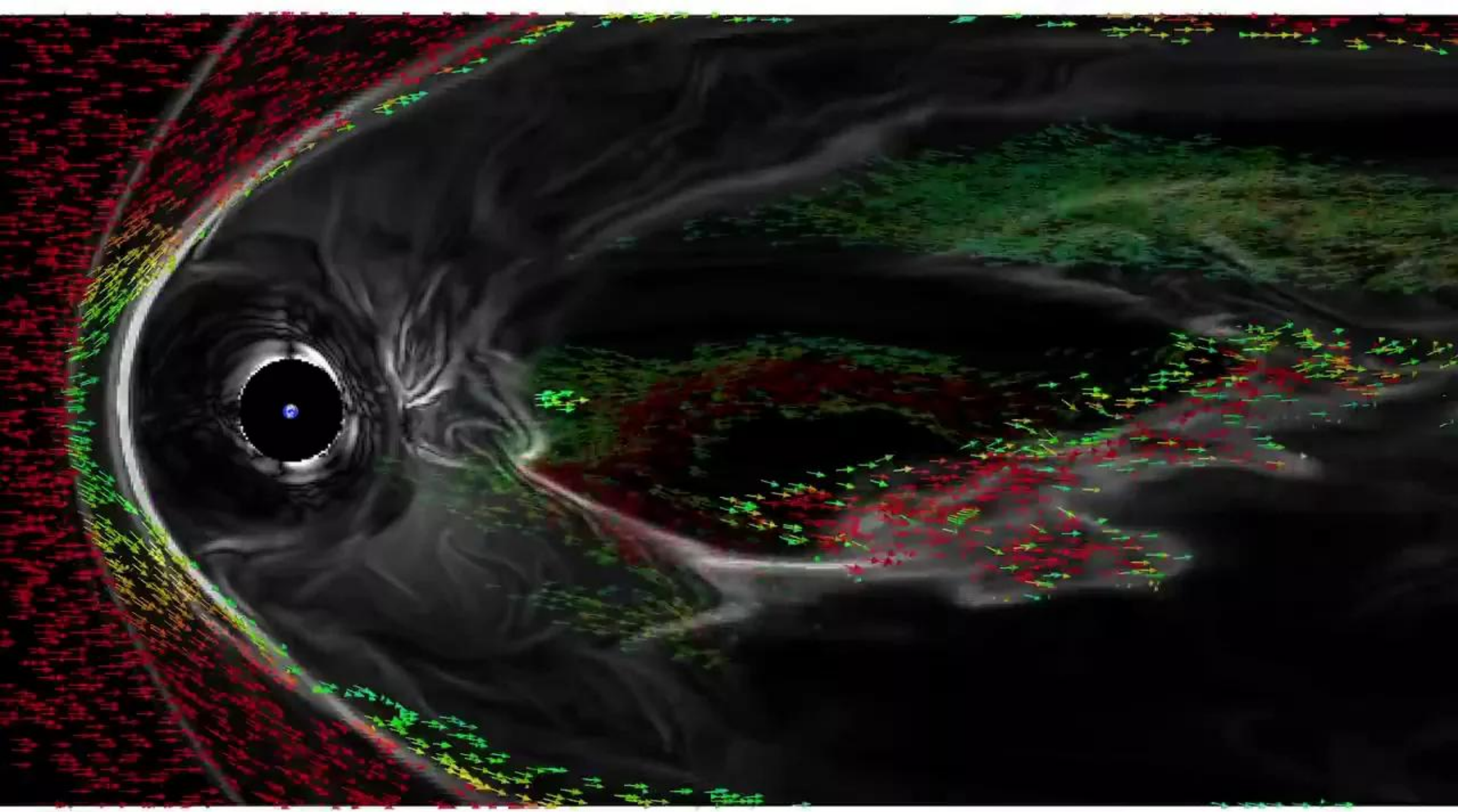

1
00:00:00,010 --> 00:00:04,060
(music)

2
00:00:04,080 --> 00:00:08,230
Hi, I'm David

3
00:00:08,250 --> 00:00:12,300
Sibeck NASA's project scientist for the THEMIS mission. We're looking at

4
00:00:12,320 --> 00:00:16,500
results from a global simulation of the solar winds interaction

5
00:00:16,520 --> 00:00:20,680
with the earth's magnetic field. The sun is located far to the

6
00:00:20,700 --> 00:00:24,800
left, far outside the picture we're looking at. The Earth is the

7
00:00:24,820 --> 00:00:28,980
small blue dot, at the center of the cavity carved out by the

8
00:00:29,000 --> 00:00:33,150
Earth's magnetic field in the oncoming super sonic solar

9
00:00:33,170 --> 00:00:37,250
wind. The boundary to the left in the figure, is the magnetopause,

10
00:00:37,270 --> 00:00:41,420
the outer most reaches of the earth's magnetic field.

11
00:00:41,440 --> 00:00:45,460
The earth's magnetic field is buffeted by the solar wind, flapping back and forth,

12
00:00:45,480 --> 00:00:49,600
like a windsock in a gust of wind. Only a

13
00:00:49,620 --> 00:00:53,780

small fraction of the solar wind mass, momentum, and energy succeed

14
00:00:53,800 --> 00:00:57,870
in entering the earth's magnetic field. The process that controls that

15
00:00:57,890 --> 00:01:02,060
entry is magnetic reconnection. Reconnection takes energy

16
00:01:02,080 --> 00:01:06,250
away from the magnetic field and gives it to the particles in the

17
00:01:06,270 --> 00:01:10,450
plasma. The typical result of reconnection is high-speed flows,

18
00:01:10,470 --> 00:01:14,490
of energized particles streaming away from the reconnection site.

19
00:01:14,510 --> 00:01:18,570
The wispy white structures that you see, are regions where

20
00:01:18,590 --> 00:01:22,750
energy is being released from the magnetic field and converted into

21
00:01:22,770 --> 00:01:26,810
accelerated plasma flows. We're now looking at flows within the

22
00:01:26,830 --> 00:01:30,990
simulation. The arrows indicate the direction the plasma is moving with

23
00:01:31,010 --> 00:01:35,180
red, indicating flows at very high speeds. Within the magnetotail,

24
00:01:35,200 --> 00:01:39,270
on the right side of the picture we see that the arrows are associated

25
00:01:39,290 --> 00:01:43,450
with the wispy white regions where energy is being converted from

26
00:01:43,470 --> 00:01:47,530
the magnetic field, to the plasma, by reconnection. Now we're looking at a

27
00:01:47,550 --> 00:01:51,710
time later in the simulation. The sight of reconnection

28
00:01:51,730 --> 00:01:55,880
has moved far down the earth's magnetotail and is generating flows of

29
00:01:55,900 --> 00:01:59,980
plasma, that is arrows, that move to the left towards the

30
00:02:00,000 --> 00:02:04,130
earth, and towards the sun.